

NORTH PACIFIC OCEAN

By WILLIS E. HURD

The weather changes on the North Pacific Ocean from August to September were generally such as might be expected to take place upon the near approach to autumn. The anticyclone west of the middle North American coast continued well developed, although more restricted in area than during August. The Aleutian Low, which had not entirely disappeared on the average during any of the summer months, gained greatly in intensity, being central over the eastern Aleutians and the Peninsula of Alaska, with pressure lower than the normal for the month. Consequent upon the considerable increase in cyclonic activity along a great portion of the northern sailing routes, more frequent gales were experienced by steamships traversing this area than during any previous month since May. The wind forces in upper latitudes were not as a rule particularly high, however, and only one reported instance showed a force higher than 9. This was given by the American steamer *President Cleveland*, which encountered a WNW. gale of force 10 in 51° N., 177° 30' W., early on the morning of the 5th.

A table of pressure data for several island and coast stations in west longitudes is given herewith. It should be noted that the average reading of 29.60 inches, for 26 days, at Dutch Harbor is too low for the month as a whole, since two of the missing p. m. observations are those of the 1st and 2d, during which days very high pressures overlay the Aleutians and Bering Sea.

TABLE 1.—Averages, departures, and extremes of atmospheric pressure at sea level at indicated hours, North Pacific Ocean, September, 1927

Stations	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	<i>Inches</i>	<i>Inch</i>	<i>Inches</i>		<i>Inches</i>	
Dutch Harbor ^{1 2}	29.60	—0.16	30.32	2d.	28.92	25th.
St. Paul ^{1 2}	29.78	+ .08	30.36	1st.	29.18	25th.
Kodiak ^{1 2}	29.69	— .01	30.10	16th	29.02	25th.
Midway Island ^{1 2}	29.64	— .13	30.08	24th	29.74	9th.
Honolulu ^{1 2}	29.98	— .02	30.09	27th.	29.86	16th.
Juneau ^{1 2}	29.64	— .08	30.47	18th.	29.20	27th.
Tatoosh Island ^{1 2}	29.94	— .07	30.21	15th.	29.49	27th.
San Francisco ^{1 2}	29.91	— .03	30.12	4th.	29.50	12th.
San Diego ^{1 2}	29.84	— .04	30.01	23d.	29.53	12th.

¹ P. m. observations only.

² For 26 days.

³ For 28 days.

⁴ For 29 days.

⁵ A. m. and p. m. observations.

⁶ Corrected to 24-hour mean.

⁷ And on other dates.

If storms over the greater part of the ocean were comparatively unimportant, not so some of those of the Tropics, since several violent cyclones raged both in the Far East and off the Mexican west coast.

An account of the September typhoons is given on page 431. The only statement that may be added to that account is with reference to the typhoon mentioned in the concluding paragraph. A report received by the Weather Bureau from the British steamer *Tamaka* indicates this vessel to have been involved rather heavily in the storm off the coast of Japan, southwest of Yokohama, where for two days—the 27th and 28th—it encountered northeasterly squalls of hurricane force. This typhoon, according to the Japanese Weather Charts, advanced seaward during the 28th, and was immediately followed by a milder cyclone, which proceeded up the east coast of the archipelago on the 29th and 30th.

Three tropical cyclones, two of which were of major intensity, and the third exhibiting localized squalls of hurricane force, raged off the Mexican west coast during September.

The first developed apparently on the 6th somewhere near and to the southward of the Gulf of Tehuantepec, that stretch of water which is becoming known as a breeding place of tropical storms. It moved northwestward and by the morning of the 8th was central west of Manzanillo, giving frequent rain squalls of hurricane strength, as experienced by the British steamer *General Smuts*. On the 9th, the center was located west of Cape Corrientes, blowing a full hurricane. The American tanker, *D. G. Scofield*, reported a pressure of 29.15 inches, in 21° 22' N., 108° 27' W. Second Officer A. M. Larsen, of this vessel, said that at 2 p. m. of this date the wind was from the south, force 12. "The vessel was swept by a continuous blinding smother of rain and spray, through which the dim loom of the fore-castle head could not be discerned from the bridge." On the 10th and the morning of the 11th strong gales to hurricane winds continued to prevail throughout the lower part of the Gulf of California from Cape Corrientes to above Mazatlan, and for a distance of a hundred or more miles to the westward of Cape San Lucas. During the 11th, however, the storm seems to have died out in the Gulf or broken up in the Cordilleras. Much damage was done to small shipping and some to larger craft; also to several of the coast towns and cities, and extraordinarily heavy accompanying rains and storm waves caused inundations, with consequent destruction to crops and houses, in addition to damage done by the winds. Quotations from a report to the Secretary of State by Mr. E. W. Eaton, American Vice Consul in Charge at Manzanillo, state:

The hurricane proper evidently passed to the west of Manzanillo some 100 or 200 miles at sea, as ships which were at sea in the vicinity of Cape San Lucas reported a wind 100 miles an hour with tremendously heavy seas. * * * The captain of the *Utecarbon* stated that he was in longitude 112.45° west and 23° north latitude when the storm was at its worst, during which time they had a wind of from 90 to 100 miles an hour and tremendously high seas for 36 hours. The captain stated that he had been going to sea for 26 years, but had never before encountered a storm equal to this one. The pilot house is 56 feet above the water line, yet a wave washed the captain and one of the mates away from the wheel in the chart room and from that time on he was compelled to steer the ship from the rear end.

The storm of the 11th and 12th seems to have been confined largely to the coast region between the western part of the Gulf of Tehuantepec and a point southeast of Manzanillo. Two or three southbound vessels reported escaping the hurricane to the northwestward only to encounter the further stormy weather of the closely following cyclone.

The third storm near the end was of utmost violence at sea. Signs of the disturbance were noticed south of the Gulf of Tehuantepec on the 25th, and on the following days, to and including the 30th, the storm moved up the coast, following very closely the track of the first. The full brunt of the hurricane was borne on the 30th by the American steamer *President Hayes*, J. J. Cadogan, master. This vessel, northward bound, entered the hurricane area with an ESE. wind and very rapidly falling pressure, in 22° 02' N., 108° 39' W., at 6 a. m. From 7:13 to 7:29 a. m. the steamer was unmanageable or until it entered the calm vortex, when it was nosed around to WSW. Pressure, meanwhile, between 7:00 and 7:29 a. m., had fallen the tremendous drop from 29.09 to 27.96 inches. The passage through the vortex occupied 31 minutes. To quote from the special report by Second Officer Niccols and Third Officer Phillips:

Approaching vortex of cyclone. Sea blown even, with solid sheet of spray, making it impossible to see a mast 30 feet away from the bridge. * * * Entered vortex with wind E. by S. Immediately encountered mountainous, confused sea, calm. Noticed

several species of birds and butterflies. * * * Air in vortex sultry, though no change was noticed in the dry bulb. Drumming in ears felt by nearly all observers. * * * Left vortex, taking approximately two minutes before encountering wind of maximum velocity, which was well over 125 miles per hour. Force of wind leveled the sea down; sheets of sea water and rain made visibility so poor that the sea alongside the vessel could not be distinguished from the bridge. * * * No green seas taken aboard. * * * At 9:30 a. m. weather had moderated sufficiently to enable vessel to hold her course and continue the voyage.

Hurricane velocities were experienced by the *President Hayes* until 8:35 a. m., by which time the pressure had risen to 29 inches. This barometric rebound, together with the preceding fall, constitutes the most rapid observed change in pressure of equal magnitude of which the writer has knowledge.

The accompanying table of gales and storms lists all vessels that have thus far sent tabular information of these Mexican hurricanes to the Weather Bureau.

At Honolulu the prevailing wind direction for September was east, and the maximum velocity was at the rate of 27 miles an hour from the east on the 7th.

At Tatoosh Island maximum velocities exceeding 60 miles an hour occurred as follows: 4th, 66 miles, from SW.; 18th, 64, E. The first occurred in connection with a strong development of the Aleutian cyclone in the Gulf of Alaska; the second, with a considerable pressure gradient existing between the oceanic anticyclone and a continental high to the northward.

Fog lessened greatly in occurrence since August, especially along the western half of the upper Pacific routes. The areas of most frequent observance were along the California coast south of the 40th parallel, where the percentage of occurrence ranged from 25 to 35; and over that part of the ocean bounded by the 45th and 50th parallels, 150th and 165th meridians of west longitude, where the percentage was about 30. Fog was noted southwest of the Bay of Panama on the 3d.

STRONG SOUTHWEST MONSOON

In a letter received from Lieut. B. C. Jackson (late R. N.) of the British steamship *Khosrou*, dated Karachi, August 24, 1927, appears the following statement:

I have had seven years experience on the Bombay, Red Sea, Persian Gulf, Bay of Bengal, and South Indian Ocean routes, and have never experienced a monsoon to compare with this year's between Aden and Colombo, especially in the vicinity of Socotra and Bombay, for heavy seas and high conspicuous swell, the wind keeping to the SW., instead of veering to the westward, as it generally does after clearing longitude of 55° E. All ships arriving in Bombay were reporting a bad passage across.

TYPHOONS AND DEPRESSIONS

FIVE TYPHOONS IN THE FAR EAST DURING SEPTEMBER, 1927

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[Weather Bureau, Manila, P. I.]

This month has been rather remarkable for the absence of typhoons, especially in the Philippines and Formosa. There was none in Formosa and only one in the Philippines, and even this one was not of a great extension and not very severe except in only one town in the eastern coast of Luzon.

In our article for last month we mentioned a typhoon which was shown by our weather maps of August 22 about 500 miles to the east of San Bernardino Strait and moved NW. by N. on the 22d and 23d; then we said that it moved very slowly for about four days to the east of northern Luzon and of the Balintang Channel, and that it seemed to be inclining again westward by the time we were writing such article. We may add here that the typhoon increased again its rate of progress on the 28th; that on

the 29th it inclined westward and traversed southern Formosa in the form of a shallow depression. But it passed near to the north of Pratas at 6 a. m. of the 30th and to the south of Hong Kong shortly after noon of the same day, moving WSW. or W. by S. It would seem, however, that after passing south of Hong Kong it inclined northwestward and struck the China coast west of the English Colony.

The Associated Press announced on September 26 that the Exchange Telegraph had received a report to the effect that 5,000 persons perished in Kwantung Province, when an immense tidal wave and typhoon struck the Chinese coast early in the month, 20,000 homes having been damaged and 400 junks and sampans destroyed, the loss being estimated at \$1,000,000. As there was no typhoon in that place at the beginning of September, we presume that the news refers to the last day of August, and that the typhoon was the one mentioned above.

The typhoon of Baler in central Luzon: September 17.—This typhoon was shown clearly for the first time on September 16, at 6 a. m. to the east of central Luzon, not far from 130° longitude E. and 15° latitude N. It moved rather rapidly to W. by N., and struck the eastern coast of Luzon during the night of the 17th, practically destroying the municipality of Baler. We have not received as yet any report from our observer at Baler, and so we can not give the barometric minimum observed at that station. Although the typhoon was much felt in the province of Pangasinan and the northern part of Nueva Ecija, yet it was not so severe as when it struck the eastern coast. The typhoon kept the same direction, W. by N., across the China Sea between Luzon and Indochina.

The approximate position of the center at 6 a. m. of the period September 17 to 20 was as follows:

September 17, 6 a. m., 125° 20' longitude E., 15° 15' latitude N.
September 18, 6 a. m., 119° 20' longitude E., 16° 20' latitude N.
September 19, 6 a. m., 115° 45' longitude E., 16° 55' latitude N.
September 20, 6 a. m., 110° 10' longitude E., 17° 30' latitude N.

Three typhoons between Bonins and Japan.—Typhoons appeared on our weather maps on August 25 and 26 about 300 miles west of the Ladrone Islands near 140° longitude E. and 15° latitude N. It moved northwest until the 29th, when it began to recurve northeastward near 130° longitude E. and 23° latitude N. On September 1 and 2 the typhoon was still moving northeastward to the SE. and E. of central Japan.

The second typhoon was shown in our weather maps of the 21st over 300 miles southwest of the Bonins and moved NE. and ENE. on the following days, 22d and 23d, passing north of the Bonins at about noon of the 23d.

The third typhoon was probably formed on the 26th to 27th east of the Loochoos, not far from 133° longitude E. and 25° latitude N. It moved northeastward on the following days, 27th to 30th, passing north of the Bonins on the 29th.

In connection with this typhoon we may mention a tornado that did considerable damage near the eastern boundary line of the city of Manila between 7 and 8 p. m. of September 17, when heavy thunderstorms were prevailing in Manila and near-by provinces. The tornado seems to have formed in the easternmost part of Pandacan, an eastern barrio of Manila, and to have moved mainly in a southeasterly or south-southeasterly direction toward San Felipe Nery, San Pedro Macati, and the Cemetery of Fort McKinley. The greatest damage was done to San Pedro Macati.

One typhoon over Japan, September 10 and 14.—This typhoon was of rather small diameter and could not be